

Down in a Valley, Up on a Ridge: Applying a Case Repertoire to Advanced Telecommunications and Rural Developments

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President Woodrow Wilson equated access to basic telecommunications services and fundamental human rights in the early decades of the 20th century (Dimech 1994). Today I'd like to direct your attention to how caring about Universal Service leads to caring about access inequality. Equal access comes to be important the more one loses signals because mountain valleys and ridges, or simply the wind, prove to be too much for the signal to get through, and the more one finds that losing signals is as detrimental as not having connectivity. Exploring connectivity issues leads to observations that telecommunications are unevenly provided, limiting even network access piggybacked on other signals or lines.

Cases of Underserved Residential Consumer Groups

I originally explored Universal Service aspects of telephones as part of a case-study research project which meant to examine adoption rates of public policy. Reports were available which identified parts of society that were left out of the telephone loop. Based on those reports, I gathered socio-economic and demographic data, ran frequency distributions, and created five cases with which to study telephone penetration relevant to the Communications Act of 1934 and the Telecommunications Act of 1996. My five cases were tribal, rural, minority, inner city, and low income. I held low income as a separate subset because it could not be presumed to be common to each of the other subsets. The minority case focused on population centers in which one minority population exceeded 20 percent of the total population.

I held tribal separate because American Indian households as a group have significantly lagged national rates of telephone penetration, because American Indian lands are often rural, and because it could not be assumed that American Indian households typified all rural households, or that rural households typified all American Indian households. Many urban American Indian households were established following the 20th century relocations. Tribal lands, however, were typically rural and had unique issues including lack of access to telephone service and lack of basic infrastructure (Federal Communications Commission [FCC] 2003, p. 88). For this case, tribal peoples on tribal lands rather than scattered urban American Indian households were the designated subset.

Rural places were described in the 1996 legislation as those with less than 10,000 inhabitants and not part of a larger metropolitan area. Small places were reported to be among the most underserved. The FCC (2003, pp. 52-87) found the least deployment of advanced telecommunications in the smallest towns and most thinly populated areas and tentatively concluded that levels of service were dependent on population density. In that

same report the FCC said the majority of rural residents did not have readily available, lowest-cost access, and were particularly vulnerable to untimely or even complete lack of access, if left to market forces alone. This vulnerability was partially attributed to some areas being too far from a central office or in too sparsely populated an area to be served. At that time, the FCC said that wireless might overcome some of these limitations but had technical limitations of its own, as the satellite might be pervasive but the satellite's reliance on a telephone's return path was problematic, and outlying areas might not stock the hardware necessary for access and advanced capability. The NTIA (Department of Commerce, National Telecommunications and Information Administration 2000) similarly described disparities in penetration affecting certain demographic groups as more noticeable in rural areas.

Critical Factors and Findings

My critical factors were household size, vacancy rates for homeowners and renters, telephone penetration, household income, and individuals below the poverty level. My key findings were that income, owner-occupancy, tenant-occupancy, and urban-rural dissimilarities were most influential in the numbers of telephone subscribers. Next I looked at small places in Iowa and Georgia, focusing on size and population density rather than demographics: both Parkersburg, Iowa, and Harlem, Georgia, are between 1,800 and 1,900 in 2000 population and have nearby larger metropolitan areas, but are in counties separate from the larger places. I used place data to examine the effects of size and density on telephone penetration and its role in economic development. As was found with the five original cases, critical data frequencies reflect the importance of household income and of distinguishing between owner-occupancy and tenant-occupancy. This has brought the factor of poverty into greater play because households below the poverty threshold are less likely to have connectivity but more likely to need it.

Generally speaking, my findings were more similar to the widespread adoption of electricity than to that of radio, even though the spread of radio is most often identified with that of telephones and other communications. This general similarity is most likely because the diffusion of electricity from its urban inceptions throughout the countryside required decades as well as specially created agencies, specially designed financial arrangements, and specially crafted intergovernmental relationships (Brown 1980).

The extent of households having telephones was reported at 34 percent in 1937, 37 percent in 1940, 95 percent in 1990, and 95-98 percent in 2000, while households with radio ranged from 39 percent in 1930, 73 percent in 1940, and 89 percent in 1947 (Bureau of the Census, 2003 & 2004-a & -b). In the late 1920s the electric industry reported slightly more than 30,000 customers; by 1980 it reported more than 90 million customers and in 1998 it reported about 124 million customers (Bureau of the Census, 2004-a & 2005). Household adoption of telephones and electricity was clearly not as rapid as that of adoption of radio.

Universal Service

According to the current FCC website, Universal Service is a sub-category of the major initiative categorized as Universal Access which includes 711 Access to TRS, Broadband Rural Workshops, Disabilities Issues, Rural Health Care Pilot Program, Telecommunications Service for Rural America, and Tribal Issues as well as Universal Service (FCC “Major Initiatives”). Throughout this research, the varying usages of Universal Service and Universal Access have been confusing. I intend to keep with the perspective that meaningful access is the key to Universal Service. Why care about Universal Service? Because without it the communication options of most everyone reading this report would be far more limited than they are.

Simply put, Universal Service is the notion that every American should have basic, affordable communication service. It’s the bargain Theodore Vail of AT&T struck with the federal government in exchange for being named a monopoly and having the nation’s sole Public Switched Telephone Network (PSTN). His company would see to it that every American home had a telephone in it (Sirota 2002). Rarely stated is that this goal had been a business objective of AT&T between 1908 and 1913. There was pre-existing corporate intent to profit from an innovation from which the general public could benefit (Sirota 2002, Webb 2002). As national policy, the standard which was adopted stressed public interest, necessity, and convenience, evolving into the Universal Service policy. As you can imagine the details and the definitions of that bargain varied somewhat from decade to decade, but for the longest time the only game in town for telecommunications was AT&T, also referred to as Bell.

In 1996 the game changed because legislation changed the definition of Universal Service as well as mandated additional structural change. It was part of the process which is termed “liberalizing” the industry, allowing for competitive market considerations. The new definition in the Telecommunications Act of 1996 said that Universal Service was whatever the FCC said it was, and the FCC could redefine it every so often. This change was premised on the claim that 95 percent of Americans had telephones and/or telephone service. The importance of this percentage is that it is the measure known as penetration by which is determined the ratio of telephone subscribers and nonsubscribers based on households and conventional telephone services, which were a part of the PSTN going forward from the time of its inculcation in the Communications Act of 1934. The FCC Common Carrier Bureau (1997) said the estimate of penetration was the fundamental measure of Universal Service.

Telephone Penetration

Penetration of 95 percent or better was nearing full “Universal Service” in the sense of 100 percent penetration even though that unserved five percent could be as many as five to six million households and regional variation could as much as double the nationally based estimate of the unserved in some states. Further breaking down the unserved revealed disproportionate numbers of underrepresented groups in nonsubscribed

households (FCC 2003, Department of Commerce, 2000); the selection of cases I originally made flowed naturally from those breakdowns.

The main thing to bear in mind is that when the public was told that telephones were serving 95 percent of the American population, all Americans as one large aggregate pool were meant. When those statistics were taken apart in terms of the usual socioeconomic indicators, when the aggregate was disaggregated, telephone service could be seen to be unevenly distributed. Significant disparities in telephone subscribers were found by income, race/origin, education, gender, housing and lifestyle, and by region and location within the region. Some groups or places had service but were still as little as 60 percent served.

Disproportionate numbers of poor and disenfranchised groups were found in households without telephone service. My study found that four of the five cases were served at levels below that of the 1990 aggregate national rate. Only the low-income case was above the 1990 national average but it was below the 2000 national average. The most telling frequency tables I developed for my cases were based on estimates from the Census Bureau, drawn in 1990 and 2000. Census Bureau estimates for telephones are not readily available until after the New Deal began taking effect.

Before the New Deal, record keeping was mostly left up to the telephone and telegraph companies. Their reports were published as received in the *Census of Electric Industries*. With the establishment of the FCC as part of the New Deal, Universal Service became national policy, the Census Bureau began collecting greater household data such as that on farms with electric horse power and houses with plumbing, and record keeping became more statist, less industrial. Both the Great Depression and WWII took their toll on available data and it was not until 1960 that the Census Bureau began systematically collecting household data on telephones. At that time the questions were limited to very large cities but with each census the questions about telephones were refined and asked of larger citizen groups in more places.

Universal Access

The public policy concept of Universal Service was distinct from its mechanisms of financial support. Mechanisms for supporting Universal Service led to the forms of finance that were the means by which affordability was to be achieved. Affordability came to be based on local rates, local calling area size, income levels, cost of living, and socio-economic indicators like educational level attained (FCC 1997). Currently the FCC maintains a web list of Universal Service goals stemming from the Telecommunications Act of 1996 which includes contributions to the Universal Service Fund (FCC 2009).

Some perspectives considered Universal Service a price-setting scheme by which the logic of rate subsidies and access charges were determined. A lot of information was available from this perspective, but I sidestepped it in favor of more fundamental concerns: either you have a telephone or you don't. If you don't, there are reasons: it may be too much for your household budget, it may be you don't want one, it may be your

household is in transition and you are in between telephones, or it may be that you're an early adopter of some innovative alternative.

If you lived in Mink, Louisiana up until 2004, it might be that you didn't have telephones because the telephone company didn't get around to wiring your hamlet of 15 persons until 2005, 46 years after your inception (Associated Press 2005). If you are unserved, for whatever reason, Mink symbolizes the next question: if income and product cost, lifestyle transition, and adoption of alternatives are not issues, would there be service for you to have if you wanted to have a telephone? In 2005 a government official identified "meaningful access" in this sense as the fundamental Universal Service issue (Department of Commerce 2005).

Wireline to Wireless Access Considerations.

You may be thinking to yourself, this is all about landline phones and no one does those anymore. Well, yes and no. A year after the breakup of the telephone company, there were a million mobile subscribers (Webb 2002), and that number has increased so much since then that people envision futures without landlines, also called wirelines. With broadcasting, electricity, and even plumbing in some ways, landlines built upon telegraphy's adaptations to create a vital physical network. That vital physical network still plays a role in facilitating access. The original layered Internet relied on telephone lines to send its data packets from sender to recipient. Advanced telecommunications typically rely on computers which rely on modems and electrical or battery power. Wireless counts on its signals being relayed. Access is important to a myriad of aspects of modern life like information seeking, job hunting, the economic development of locales, and educational achievement.

A 2009 news article by Giegerich highlighted the modern importance of access, stating, "It's a paradox of technology that the old way of finding a job was in many ways far more equitable to the poor, said Laura Robinson, an assistant professor of sociology at Santa Clara University. 'Before, people had a cheap way to access information,' Robinson said. 'They'd pay a quarter for a newspaper, check the want ads, circle the jobs that interested them and for the cost of the stamp, they could send (applications and resumes) on.' Employers, in kind, responded to applications by mail or telephone. Today, as often as not, the follow-up correspondence arrives via e-mail."

Giegerich went on to note that low-income urban residents often have access to public transportation, but low-income rural residents not only lack public transit but more than half also lack access to private vehicles in operating condition. The double whammy of lack of telecommunications access and reliable transportation is depicted as widening the digital divide, as well as increasing the gap between poor and rich, the have-nots and the haves. In addition, the article cites research by the Pew Foundation's *Internet and American Life Project* (2009), which uses survey data to provide an ongoing statistical depiction of changes in usage of advanced telecommunications. These statistics illustrate an increasing societal reliance on technology where technology is available.

Underserved Tribal Lands

My tribal case is a point-in-fact regarding the disparity between presumptions of employers, who assume everyone has a computer readily available, and the reality faced by millions of impoverished job seekers. The Reservation in my case had a 23.9 percent poverty rate in 1990 and a 23 percent poverty rate in 2000. Its penetration rate was better than many tribal lands: 90.2 percent in 1990 and 84.3 percent in 2000. The county in which the Reservation is located dropped from 90.2 percent penetration in 1990 to 88.4 percent in 2000, and displayed a large disparity between reservation housing units and non-reservation housing units: 12 percent of the reservation's housing units had no telephone, seven percent of the housing units in the nearby non-reservation town had no telephone, and five percent of the county non-reservation housing units were without a telephone.

Table 1: Comparison of Case Reservation, County of Reservation, and Overall National Penetration Rates

	<u>1990</u>	<u>2000</u>	Approximate % of Y2000 housing without telephones
Case Reservation Penetration	90.2%	84.3%	16%
County of Reservation Penetration	90.2%	88.4%	12%
Nat'l American Indian Penetration	46.6%	67.9%	32%

Source: FCC-Wireline 2003; Bureau of the Census 2004 a & b, 2003, 1994.

Table 1 contrasts the penetration for the overall American Indian segment with that of the reservation in my case and the county in which the reservation was located. The overall rate was 67.9 percent in 2000, whereas penetration for all housing units nationwide was 83.1 percent (FCC 2003; Bureau of the Census 1994). Ten years earlier the nationwide tribal penetration level was more than 20 percent lower, and comparable 1990 Census data indicated a 46.6 percent penetration rate for American Indian households. Bureau of Indian Affairs (BIA) information was not available because of the *Cobell v. Norton* litigation filed in 1996 over the unsatisfactory handling by the U.S. Interior Department, parent agency of the BIA, of trust monies and trust lands belonging to America's tribal populations.

According to Glasmeier's 2006 study of American poverty patterns, there are more than 500 tribes in America, totaling more than four million people. About 25 percent of this population lives on tribal lands or areas designated as Native American lands, say about one million. Of that one million, more than 29 percent live in poverty, or about 300,000. Income levels on tribal lands are about 20 percent below the national average. "Regardless of where they live, Native Americans experience high rates of poverty relative to the national average," said Glasmeier (2006, p. 62). Inequities of accessibility emphasize the importance of society's distribution of its resources. The importance of this inequity is indicated by the request for comments from the public (FCC Facebook Notes 2009) about specific barriers on tribal lands and how they might be addressed, a request which said in part, "We know that Tribal lands are among the

most unserved/underserved areas of the country with respect to broadband deployment and adoption."

The 2003 FCC report previously cited elaborated on tribal lands being typically rural and having unique issues, including lack of access to telephone service and lack of basic infrastructure. Much of the Census Bureau data I reviewed bore out this observation. Glasmeier (2006) found similarly. Forty percent of Native Americans live in overcrowded or physically inadequate housing conditions. The rate for the general population is six percent. Glasmeier estimated 200,000 housing units as the immediate need on reservations. The Census Bureau collects data on quality of housing, including having plumbing, a kitchen, and a telephone. One in five homes on reservations lacks complete in-house plumbing, a rate 20 times that of the national average. Almost 20 percent lack kitchens. Lastly, Glasmeier found that between 20 and 30 percent of homes on reservations lack telephones, somewhat less than the approximate 32 percent I found in my Census Bureau research as indicated in Table 1.

Native American Poverty and Economic Development

Native American poverty has historically been tied to the lack of economic development. Some authors saw casinos as an attempt at economic development, but more cautioned that gaming was at best a lopsided approach with little resilience to broad economic downturns. The 2009 federal stimulus package was taken advantage of by many tribes, some of whom included modernization of housing, transportation, and communications in their plans for the funds. Although the American Recovery and Reinvestment Act (ARRA) includes an impact summary by place and recipient, there was not a tribal summary found either on the Recovery Act site or on the National Congress of American Indians (NCAI) website of the impact expected of ARRA, the National Broadband Initiative, or similar recent opportunities presented by the Federal government. Although not quantified for this report, it is reasonable to presume that the more than \$4.2 billion designated for Indian Country will have significant impact.

Jobs are integral to the economic well-being of places, and are integral to keeping individual poverty at bay (especially for those not of the leisure "class"). Glimpses into the depths of early economic development history tell us that the original, and still driving, point of economic development is jobs. And since quality of life is important, jobs which produce good quality of life for their holders and thus their communities are preferred, but jobs in general are preferred to no jobs whatsoever. Economic development is related to critical public policy thrusts and pretty much has been since their earliest efforts: measuring poverty, social stratification, social welfare, social mobility, productivity, and sustainability are just a few of the broader areas which link with economic development. An argument could be made that in modern times the relationship of advanced telecommunications and economic development is particularly important to those same public policy areas.

With or without wireline phones, telephone technology is important to advanced telecommunications, particularly Internet access, and to secure communications. It is

important because very basic social studies reveal that marginalization has a long history in the modern world – “out” groups are ostracized and/or marginalized and “in” groups grab more of the socio-economic pie for themselves. If we don’t get access policies right, entire subcultures and underrepresented groups may be denied full participation in modern life. In a midterm review of the developing National Broadband Plan webcast from an open Commission meeting, the FCC identified the most marginalized and vulnerable to lack of access now as low income, rural, minority, non-English speaking, and/or tribal groups (FCC Facebook Page Notes 2009).

Another reason for the continuing importance of telephone technology is that the access issues of 1996’s predominant landline culture haven’t been resolved; they’ve only re-manifested themselves as 2009’s predominant computer and wireless culture issues. Because data for advanced and wireless services is new and sparse, proven data like that of wirelines serves as a surrogate for access issues for advanced telecommunications. The September 2009 FCC webcast noted that the economics of providing broadband to the rural U.S. are challenging because of low linear density, similar to the 1970s argument about not extending the PSTN into rural areas. Additionally, some Universal Service Fund recipients were said to have upgraded their plants to bring broadband to rural consumers, while the fund itself has come to face severe structural and systemic problems. Without speculation, extensive data analysis was recommended by the experts presenting the midterm review. To its credit, the FCC has maintained an Indian Telecommunications Initiative (ITI, found at <http://www.fcc.gov/indians/>) since some while after passage of the Telecommunications Act of 1996. This resource, including its statement on establishing a government-to-government relationship with Indian tribes, has not indicated any overt conflict with the more recent effort to implement a National Broadband Plan.

As I concluded last year, altogether, the principal implication here is that distinguishing choice and circumstance in omissions from telephony links is important in matters of marginalization, especially to the extent that competitive policies have not assured the poor and disenfranchised of being served. From an economic development perspective, advanced telecommunications secure that bi-directional link between areas and people by which a small place can be a player in the greater environment and without which marginalization and uneven distribution can increase digital divisions. My general premise more simply put is that opportunity is good, more opportunity is better than less, and both people and places need opportunity to maximize their potential. Each of these three considerations has in common the role of telephones, now more commonly referred to as advanced telecommunications, in the sense of conducting personal business, maintaining interpersonal communications, and accomplishing the business of business and services. By originally relying on telephones to transmit data packets, the Internet furthered the importance of advanced telecommunications in modern society. As well, advanced telecommunications are a modern convenience graced with the concern of both private and public sectors, so that regulatory policy is pertinent.

Placing importance on choice and circumstance, on whether you don’t have a phone because you don’t want to or because the system has omitted or overlooked you,

naturally results from reviewing network issues, Universal Service, and access inequities. Equal access paves the way for less asymmetric information and leads to better opportunities, which, in turn, lead to better quality of life as well as to realization of potential for both persons and places. I came to include the premise that losing signals to mountain ridges and valleys or even the wind is as detrimental to taking advantage of opportunity as not even having connectivity. Those of us who can remember when radio signals first were able to get through highway overpasses find it hard to believe that modern technicians can't move mountains or redirect the winds. Seriously, though, I found that telephones are not as ubiquitous as we might think, and this was problematic for the good that network connectivity could do.

Conclusion

In 1996 if you didn't have a telephone, then you had little option for connecting to the World Wide Web. Today you can go to the public library or other wired public spaces but are still not as advantaged as those who have everything at their fingertips in their own homes. Pew research indicates that "affordable personal computers and laptops and expanded community broadband access won't be a factor if, or when, the digital divide does narrow for low-income job-seekers," but instead that smart phones may be able to close some of the information gaps between upper and middle class and lower-income users, if price can be removed as an issue (Giegerich 2009). As stated at the outset, households in poverty, even working poor and low-income households, are much less likely to be connected or have access yet, so much more likely to need that link to resources outside the home. Income and housing primarily drive the consumer decision making processes; population density and cost-to-benefit drive producer rationales for uneven delivery of service capability. Recently I have been considering building a 100-place data base with which to more specifically track differences in tribal, rural, low-income, and urban deployment of advanced telecommunications, hoping to see lots of maximization of potential from telephony innovations made affordable as well as available.

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